Applied Physics Letters
A weekly journal featuring concise, up-to-date reports on significant new findings in applied physics.

Applied Physics Letters -- May 9, 1994 -- Volume 64, Issue 19, pp. 2557-2559

Nonalloyed ohmic contacts on GaN using InN/GaN short-period superlattices

M. E. Lin, F. Y. Huang, and H. Morkoç
Materials Research Laboratory and Coordinated Science Laboratory, University of Illinois at Urbana-Champaign, 104 S. Goodwin Avenue, Urbana, Illinois 61801

(Received 29 November 1993; accepted 17 February 1994)

It is well known that ohmic contacts on GaN, a highly promising material for electronic and optoelectronic devices with a wide band gap of about 3.4 eV, constitute a major obstacle to further development of devices based on this material. We demonstrated a novel scheme of nonalloyed ohmic contacts on GaN using a short-period superlattice (SPS), composed of GaN and narrow band-gap InN, sandwiched between the GaN channel and an InN cap layer. Comparison with a similar layer without the SPS structure indicates that quantum tunneling through the SPS conduction band effectively reduces the potential barrier formed by the InN/GaN heterostructure leading to low contact resistivities. From the transmission-line-method measurements, specific contact resistances as low as 6×10^{-5} Ω cm^2 with GaN doped at about 5×10^{18} cm^{-3} have been obtained without any post-annealing. Theoretical estimation based on the SPS tunneling model is consistent with the experiment.

doi:10.1063/1.111573
PACS: 73.40.Cg, 73.61.Ey Additional Information

☐ **Full Text:** [PDF (331 kB) GZipped PS] Order

crossref The American Institute of Physics is a member of CrossRef.

[Previous / Next Abstract | Issue Table of Contents | Top of Page]

Show References

Article Collection: View Collection Help (Click on the ☐ to add an article.)

[APL Home] [All Online Issues: Browse | Search] [SPIN Database: Browse | Search] [HELP] [EXIT]